**Analyzing the Impact of Car Features on Price and Profitability**

**Tasks: Analysis**

Before diving into the analysis of the given dataset, it is important to perform thorough data cleaning to ensure accurate and reliable results. You need to build an interactive dashboard in Excel from the tasks given below:

**Insight Required:** How does the popularity of a car model vary across different market categories?

* **Task 1.A:** Create a pivot table that shows the number of car models in each market category and their corresponding popularity scores.
* **Task 1.B:** Create a combo chart that visualizes the relationship between market category and popularity.

|  |  |
| --- | --- |
| **Market Catego Market Category ry** | **Average Average of Popularity of Popula** |
| Crossover | 1545.263063 |
| Crossover,Diesel | 873 |
| Crossover,Exotic,Luxury,High-Performance | 238 |
| Crossover,Exotic,Luxury,Performance | 238 |
| Crossover,Factory Tuner,Luxury,High-Performance | 1823.461538 |
| Crossover,Factory Tuner,Luxury,Performance | 2607.4 |
| Crossover,Factory Tuner,Performance | 210 |
| Crossover,Flex Fuel | 2073.75 |
| Crossover,Flex Fuel,Luxury | 1173.2 |
| Crossover,Flex Fuel,Luxury,Performance | 1624 |
| Crossover,Flex Fuel,Performance | 5657 |
| Crossover,Hatchback | 1675.694444 |
| Crossover,Hatchback,Factory Tuner,Performance | 2009 |
| Crossover,Hatchback,Luxury | 204 |
| Crossover,Hatchback,Performance | 2009 |
| Crossover,Hybrid | 2563.380952 |
| Crossover,Luxury | 884.5487805 |
| Crossover,Luxury,Diesel | 2149.411765 |
| Crossover,Luxury,High-Performance | 1037.222222 |
| Crossover,Luxury,Hybrid | 630.9166667 |
| Crossover,Luxury,Performance | 1344.849558 |
| Crossover,Luxury,Performance,Hybrid | 3916 |
| Crossover,Performance | 2585.956522 |
| Diesel | 1730.904762 |
| Diesel,Luxury | 2275 |
| Exotic,Factory Tuner,High-Performance | 1046.380952 |
| Exotic,Factory Tuner,Luxury,High-Performance | 517.5384615 |
| Exotic,Factory Tuner,Luxury,Performance | 520 |
| Exotic,Flex Fuel,Factory Tuner,Luxury,High-Performance | 520 |
| Exotic,Flex Fuel,Luxury,High-Performance | 520 |
| Exotic,High-Performance | 1271.333333 |
| Exotic,Luxury | 112.6666667 |
| Exotic,Luxury,High-Performance | 467.0759494 |
| Exotic,Luxury,High-Performance,Hybrid | 204 |
| Exotic,Luxury,Performance | 217.0277778 |
| Exotic,Performance | 1391 |
| Factory Tuner,High-Performance | 1941.415094 |
| Factory Tuner,Luxury | 617 |
| Factory Tuner,Luxury,High-Performance | 2133.367442 |
| Factory Tuner,Luxury,Performance | 1413.419355 |
| Factory Tuner,Performance | 1695.695652 |
| Flex Fuel | 2217.302752 |
| Flex Fuel,Diesel | 5657 |
| Flex Fuel,Factory Tuner,Luxury,High-Performance | 258 |
| Flex Fuel,Hybrid | 155 |
| Flex Fuel,Luxury | 746.5384615 |
| Flex Fuel,Luxury,High-Performance | 878.9090909 |
| Flex Fuel,Luxury,Performance | 1380.071429 |
| Flex Fuel,Performance | 1680.471264 |
| Flex Fuel,Performance,Hybrid | 155 |
| Hatchback | 1318.865835 |
| Hatchback,Diesel | 873 |
| Hatchback,Factory Tuner,High-Performance | 1205.153846 |
| Hatchback,Factory Tuner,Luxury,Performance | 886.8888889 |
| Hatchback,Factory Tuner,Performance | 2159.045455 |
| Hatchback,Flex Fuel | 5657 |
| Hatchback,Hybrid | 2121.25 |
| Hatchback,Luxury | 1379.5 |
| Hatchback,Luxury,Hybrid | 454 |
| Hatchback,Luxury,Performance | 1566.131579 |
| Hatchback,Performance | 1039.646825 |
| High-Performance | 1821.447236 |
| Hybrid | 2105.569106 |
| Luxury | 1102.65731 |
| Luxury,High-Performance | 1668.017964 |
| Luxury,High-Performance,Hybrid | 568.8333333 |
| Luxury,Hybrid | 673.6346154 |
| Luxury,Performance | 1292.615156 |
| Luxury,Performance,Hybrid | 2333.181818 |
| N/A | 1676.889364 |
| Performance | 1348.873544 |
| Performance,Hybrid | 155 |
| (blank) |  |
| **Grand** GRAND TOTAL **TotalG** | 1554.911197 |

**Insight Required:** What is the relationship between a car's engine power and its price?

* **Task 2:**  Create a scatter chart that plots engine power on the x-axis and price on the y-axis. Add a trendline to the chart to visualize the relationship between these variables.

**Insight Required:** Which car features are most important in determining a car's price?

* **Task 3:** Use regression analysis to identify the variables that have the strongest relationship with a car's price. Then create a bar chart that shows the coefficient values for each variable to visualize their relative importance.

|  |  |
| --- | --- |
| **correlation coeff** | **Columns with high corrlation coeff** |
| 0.662008 | Engine HP |
| 0.531312486 | Engine Cylinders |
| -0.126635158 | Number of Doors |
| -0.15768 | city mpg |
| -0.16004268 | highway MPG |

**Insight Required:** How does the average price of a car vary across different manufacturers?

* **Task 4.A:** Create a pivot table that shows the average price of cars for each manufacturer.
* **Task 4.B:** Create a bar chart or a horizontal stacked bar chart that visualizes the relationship between manufacturer and average price.

|  |  |
| --- | --- |
| **Row Labels** | **Average of MSRP** |
| Acura | 34887.5873 |
| Alfa Romeo | 61600 |
| Aston Martin | 197910.3763 |
| Audi | 53452.1128 |
| Bentley | 247169.3243 |
| BMW | 61546.76347 |
| Bugatti | 1757223.667 |
| Buick | 28206.61224 |
| Cadillac | 56231.31738 |
| Chevrolet | 28350.38557 |
| Chrysler | 26722.96257 |
| Dodge | 22390.05911 |
| Ferrari | 238218.8406 |
| FIAT | 22670.24194 |
| Ford | 27399.26674 |
| Genesis | 46616.66667 |
| GMC | 30493.29903 |
| Honda | 26674.34076 |
| HUMMER | 36464.41176 |
| Hyundai | 24597.0363 |
| Infiniti | 42394.21212 |
| Kia | 25310.17316 |
| Lamborghini | 331567.3077 |
| Land Rover | 67823.21678 |
| Lexus | 47549.06931 |
| Lincoln | 42839.82927 |
| Lotus | 69188.27586 |
| Maserati | 114207.7069 |
| Maybach | 546221.875 |
| Mazda | 20039.38298 |
| McLaren | 239805 |
| Mercedes-Benz | 71476.22946 |
| Mitsubishi | 21240.53521 |
| Nissan | 28583.4319 |
| Oldsmobile | 11542.54 |
| Plymouth | 3122.902439 |
| Pontiac | 19321.54839 |
| Porsche | 101622.3971 |
| Rolls-Royce | 351130.6452 |
| Saab | 27413.5045 |
| Scion | 19932.5 |
| Spyker | 213323.3333 |
| Subaru | 24827.50391 |
| Suzuki | 17907.20798 |
| Tesla | 85255.55556 |
| Toyota | 29030.01609 |
| Volkswagen | 28102.38072 |
| Volvo | 28541.16014 |
| blank |  |
| **Grand Total** | **40594.73703** |

**Insight Required:** What is the relationship between fuel efficiency and the number of cylinders in a car's engine?

* **Task 5.A:** Create a scatter plot with the number of cylinders on the x-axis and highway MPG on the y-axis. Then create a trendline on the scatter plot to visually estimate the slope of the relationship and assess its significance.
* **Task 5.B:** Calculate the correlation coefficient between the number of cylinders and highway MPG to quantify the strength and direction of the relationship.

|  |  |
| --- | --- |
| **correlation coeff** | **Columns with high corrlation coeff** |
| -0.62161 | highway MPG |
| -0.60078 | city mpg |

**Building the Dashboard:**

Now for the Next portion of the Project, you need to create the Interactive Dashboard.

Use filters and slicers to make the chart interactive. The client has requested these questions given below:

**Task 1:** How does the distribution of car prices vary by brand and body style?

* **Hints:** Stacked column chart to show the distribution of car prices by brand and body style. Use filters and slicers to make the chart interactive. Calculate the total MSRP for each brand and body style using SUMIF or Pivot Tables.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sum of MSRP** | **Column Labels** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Row Labels** | **2dr Hatchback** | **2dr SUV** | **4dr Hatchback** | **4dr SUV** | **Cargo Minivan** | **Cargo Van** | **Convertible** | **Convertible SUV** | **Coupe** | **Crew Cab Pickup** | **Extended Cab Pickup** | **Passenger Minivan** | **Passenger Van** | **Regular Cab Pickup** | **Sedan** | **Wagon** | **(blank)** | **Grand Total** |
| Acura | 480917 |  | 357440 | 2663505 |  |  |  |  | 793748 |  |  |  |  |  | 4294702 | 201360 |  | 8791672 |
| Alfa Romeo |  |  |  |  |  |  | 129800 |  | 178200 |  |  |  |  |  |  |  |  | 308000 |
| Aston Martin |  |  |  |  |  |  | 7321655 |  | 9635275 |  |  |  |  |  | 1448735 |  |  | 18405665 |
| Audi | 4000 |  |  | 2674900 |  |  | 3291405 |  | 3556290 |  |  |  |  |  | 7158348 | 847350 |  | 17532293 |
| Bentley |  |  |  |  |  |  | 6012870 |  | 6356760 |  |  |  |  |  | 5920900 |  |  | 18290530 |
| BMW | 80097 |  | 1144950 | 3160950 |  |  | 4502671 |  | 3419051 |  |  |  |  |  | 7989300 | 259600 |  | 20556619 |
| Bugatti |  |  |  |  |  |  |  |  | 5271671 |  |  |  |  |  |  |  |  | 5271671 |
| Buick |  |  |  | 2141770 |  |  | 179325 |  | 18534 |  |  | 330065 |  |  | 2850590 | 8212 |  | 5528496 |
| Cadillac |  |  |  | 7182555 |  |  | 985607 |  | 2953574 | 599150 |  |  |  |  | 9418847 | 1184100 |  | 22323833 |
| Chevrolet | 8000 | 213310 | 1287260 | 6569568 | 420150 | 78688 | 2953245 | 106300 | 3504525 | 5927617 | 3117951 | 1178515 | 607670 | 2260032 | 3303977 | 300675 |  | 31837483 |
| Chrysler | 98805 |  |  | 250545 |  |  | 630105 |  | 114510 |  |  | 922295 |  |  | 2479859 | 501075 |  | 4997194 |
| Dodge | 48000 | 44000 | 18000 | 2572405 | 60520 | 338497 | 12000 |  | 3264627 | 2235775 | 864172 | 557425 | 70708 | 719408 | 2417585 | 793055 |  | 14016177 |
| Ferrari |  |  |  |  |  |  | 4723811 |  | 11713289 |  |  |  |  |  |  |  |  | 16437100 |
| FIAT | 420715 |  |  | 369305 |  |  | 327965 |  |  |  |  |  |  |  |  | 287570 |  | 1405555 |
| Ford | 36000 | 479873 | 567615 | 4482771 | 702400 | 566351 | 730007 |  | 1398144 | 3812353 | 2285584 | 1411605 | 2431898 | 1299240 | 2299348 | 1635565 |  | 24138754 |
| Genesis |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 139850 |  |  | 139850 |
| GMC |  | 144319 |  | 6641919 | 142750 | 468085 |  |  |  | 4062482 | 2183866 | 150630 | 603670 | 1306328 |  |  |  | 15704049 |
| Honda | 413200 |  | 2088520 | 3953209 |  |  | 252135 |  | 1588705 | 787720 |  | 553185 |  |  | 2340105 |  |  | 11976779 |
| HUMMER |  |  |  | 377490 |  |  |  |  |  | 242405 |  |  |  |  |  |  |  | 619895 |
| Hyundai | 1038050 |  | 528880 | 2128890 |  |  |  |  | 724070 |  |  | 133075 |  |  | 2899937 |  |  | 7452902 |
| Infiniti |  |  |  | 4340200 |  |  | 980050 |  | 2175750 |  |  |  |  |  | 6494090 |  |  | 13990090 |
| Kia |  |  | 406960 | 2049645 |  |  |  |  | 142630 |  |  | 494650 |  |  | 1980360 | 772405 |  | 5846650 |
| Lamborghini |  |  |  |  |  |  | 7064450 |  | 10177050 |  |  |  |  |  |  |  |  | 17241500 |
| Land Rover |  | 476394 |  | 9076595 |  |  |  | 145731 |  |  |  |  |  |  |  |  |  | 9698720 |
| Lexus |  |  | 94700 | 3152974 |  |  | 472065 |  | 1016472 |  |  |  |  |  | 4837596 | 31105 |  | 9604912 |
| Lincoln |  |  |  | 3422570 |  |  |  |  | 25342 | 453260 |  |  |  |  | 2854855 | 269705 |  | 7025732 |
| Lotus |  |  |  |  |  |  | 413260 |  | 1593200 |  |  |  |  |  |  |  |  | 2006460 |
| Maserati |  |  |  | 155000 |  |  | 2342963 |  | 1972284 |  |  |  |  |  | 2153800 |  |  | 6624047 |
| Maybach |  |  |  |  |  |  | 2762750 |  |  |  |  |  |  |  | 5976800 |  |  | 8739550 |
| Mazda | 22000 | 24000 | 853180 | 3222525 |  |  | 870505 |  | 543879 |  | 580033 | 443130 |  | 265486 | 1618571 | 33350 |  | 8476659 |
| McLaren |  |  |  |  |  |  | 280225 |  | 918800 |  |  |  |  |  |  |  |  | 1199025 |
| Mercedes-Benz |  |  | 122800 | 4974610 | 28950 |  | 5753964 |  | 6473107 |  |  | 32500 |  |  | 7080243 | 764935 |  | 25231109 |
| Mitsubishi | 394868 |  | 407835 | 2066505 | 2000 |  | 209893 |  |  | 240210 | 134360 | 2000 |  | 8000 | 1058563 |  |  | 4524234 |
| Nissan | 14683 |  | 1347320 | 4149630 | 128620 |  | 1406552 | 131075 | 2943632 | 2422300 | 1026379 | 413320 |  | 21914 | 1769130 | 175000 |  | 15949555 |
| Oldsmobile |  |  |  | 238150 |  |  | 2000 |  | 286015 |  |  | 492055 |  |  | 691161 | 22000 |  | 1731381 |
| Plymouth | 42000 |  | 16000 |  |  |  | 85631 |  | 14000 |  |  | 33688 |  |  | 46759 | 18000 |  | 256078 |
| Pontiac | 163505 |  | 162975 | 401550 |  |  | 473481 |  | 667715 |  |  | 541192 |  |  | 1160535 | 22855 |  | 3593808 |
| Porsche | 28827 |  |  | 1815200 |  |  | 4504586 |  | 4758533 |  |  |  |  |  | 2713500 |  |  | 13820646 |
| Rolls-Royce |  |  |  |  |  |  | 2141365 |  | 2204675 |  |  |  |  |  | 6539010 |  |  | 10885050 |
| Saab | 14000 |  | 36586 | 541905 |  |  | 632628 |  |  |  |  |  |  |  | 1066500 | 751280 |  | 3042899 |
| Scion | 366325 |  | 282470 |  |  |  |  |  | 330210 |  |  |  |  |  | 32500 | 184445 |  | 1195950 |
| Spyker |  |  |  |  |  |  | 219990 |  | 419980 |  |  |  |  |  |  |  |  | 639970 |
| Subaru | 12000 |  | 678060 | 3020230 |  |  |  |  | 356476 | 365975 |  |  |  |  | 1913100 | 10000 |  | 6355841 |
| Suzuki | 46496 | 14000 | 584387 | 2362141 |  |  |  | 122194 |  | 304131 | 259659 |  |  |  | 1906715 | 685707 |  | 6285430 |
| Tesla |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1534600 |  |  | 1534600 |
| Toyota | 473750 |  | 1397750 | 5106450 |  |  | 386668 |  | 811995 | 3893760 | 3558504 | 1956518 |  | 373446 | 2459596 | 1237955 |  | 21656392 |
| Volkswagen | 4171275 |  | 3355760 | 2084955 |  |  | 3612631 |  | 8000 |  |  | 1038130 |  |  | 6760050 | 1704025 |  | 22734826 |
| Volvo | 157550 |  |  | 3219000 |  |  | 121600 |  | 6000 |  |  |  |  |  | 2086945 | 2428971 |  | 8020066 |
| (blank) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Grand Total** | **8535063** | **1395896** | **15739448** | **100569617** | **1485390** | **1451621** | **66789858** | **505300** | **92336718** | **25347138** | **14010508** | **10683978** | **3713946** | **6253854** | **119697062** | **15130300** |  | **483645697** |

**Task 2:** Which car brands have the highest and lowest average MSRPs, and how does this vary by body style?

* **Hints:** Clustered column chart to compare the average MSRPs across different car brands and body styles. Calculate the average MSRP for each brand and body style using AVERAGEIF or Pivot Tables.

|  |  |  |  |
| --- | --- | --- | --- |
| **Row Labels** | **Max of MSRP** | **Min of MSRP** | **Average of MSRP** |
| Acura | 156000 | 2000 | 79000 |
| Alfa Romeo | 68400 | 53900 | 61150 |
| Aston Martin | 320695 | 98200 | 209447.5 |
| Audi | 199900 | 2000 | 100950 |
| Bentley | 363000 | 177500 | 270250 |
| BMW | 141200 | 4697 | 72948.5 |
| Bugatti | 2065902 | 1500000 | 1782951 |
| Buick | 49625 | 2000 | 25812.5 |
| Cadillac | 104215 | 2000 | 53107.5 |
| Chevrolet | 92395 | 2000 | 47197.5 |
| Chrysler | 49470 | 2000 | 25735 |
| Dodge | 120395 | 2000 | 61197.5 |
| Ferrari | 643330 | 140615 | 391972.5 |
| FIAT | 31800 | 15990 | 23895 |
| Ford | 149995 | 2000 | 75997.5 |
| Genesis | 54550 | 41400 | 47975 |
| GMC | 71665 | 2000 | 36832.5 |
| Honda | 47070 | 2000 | 24535 |
| HUMMER | 43130 | 30750 | 36940 |
| Hyundai | 68750 | 2000 | 35375 |
| Infiniti | 88850 | 2000 | 45425 |
| Kia | 61900 | 2000 | 31950 |
| Lamborghini | 1500000 | 187900 | 843950 |
| Land Rover | 199495 | 2561 | 101028 |
| Lexus | 375000 | 2000 | 188500 |
| Lincoln | 76650 | 2000 | 39325 |
| Lotus | 93225 | 43995 | 68610 |
| Maserati | 182009 | 69800 | 125904.5 |
| Maybach | 1382750 | 366000 | 874375 |
| Mazda | 44015 | 2000 | 23007.5 |
| McLaren | 280225 | 184900 | 232562.5 |
| Mercedes-Benz | 495000 | 2000 | 248500 |
| Mitsubishi | 38995 | 2000 | 20497.5 |
| Nissan | 149990 | 2000 | 75995 |
| Oldsmobile | 36795 | 2000 | 19397.5 |
| Plymouth | 44625 | 2000 | 23312.5 |
| Pontiac | 37610 | 2000 | 19805 |
| Porsche | 440000 | 2667 | 221333.5 |
| Rolls-Royce | 492425 | 219900 | 356162.5 |
| Saab | 51330 | 2000 | 26665 |
| Scion | 31090 | 12480 | 21785 |
| Spyker | 219990 | 209990 | 214990 |
| Subaru | 39995 | 2000 | 20997.5 |
| Suzuki | 31749 | 2000 | 16874.5 |
| Tesla | 134500 | 66000 | 100250 |
| Toyota | 84325 | 2000 | 43162.5 |
| Volkswagen | 101300 | 2000 | 51650 |
| Volvo | 65700 | 2000 | 33850 |
| (blank) |  |  |  |
| **Grand Total** | **2065902** | **2000** | **7553135** |

**Task 3:** How do the different feature such as transmission type affect the MSRP, and how does this vary by body style?

* **Hints:** Scatter plot chart to visualize the relationship between MSRP and transmission type, with different symbols for each body style. Calculate the average MSRP for each combination of transmission type and body style using AVERAGEIFS or Pivot Tables.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Average of MSRP** | **Column Labels** |  |  |  |  |  |  |
| **Row Labels** | **AUTOMATED\_MANUAL** | **AUTOMATIC** | **DIRECT\_DRIVE** | **MANUAL** | **UNKNOWN** | **(blank)** | **Grand Total** |
| 2dr Hatchback | 27180.96491 | 20926.464 | 31800 | 13353.65831 | 7361.5 |  | 16867.71344 |
| 2dr SUV |  | 18615.20455 |  | 6303.811111 | 2371 |  | 10115.18841 |
| 4dr Hatchback | 29249.07407 | 23833.67898 | 32799.72973 | 17594.41313 |  |  | 22420.8661 |
| 4dr SUV | 40451.15385 | 41535.60646 | 49800 | 15426.46226 |  |  | 40421.87178 |
| Cargo Minivan |  | 20920.98592 |  |  |  |  | 20920.98592 |
| Cargo Van |  | 15280.22105 |  |  |  |  | 15280.22105 |
| Convertible | 121256.6444 | 90637.3869 |  | 62357.75625 | 5783.5 |  | 84224.28499 |
| Convertible SUV |  | 38925.5 |  | 9233.142857 |  |  | 17424.13793 |
| Coupe | 245977.4252 | 63371.81076 |  | 50484.37241 | 2000 |  | 76248.32205 |
| Crew Cab Pickup |  | 37744.07154 |  | 28360.52632 |  |  | 37220.46696 |
| Extended Cab Pickup |  | 30637.34973 |  | 10884.19455 |  |  | 22488.77689 |
| Passenger Minivan |  | 26412.68159 |  | 4405.333333 |  |  | 25621.05036 |
| Passenger Van |  | 29015.20313 |  |  |  |  | 29015.20313 |
| Regular Cab Pickup |  | 28536.8239 |  | 7557.773333 | 2000 |  | 15953.70918 |
| Sedan | 47498.70813 | 43769.1165 | 79512.25 | 17119.23374 | 2000 |  | 39270.68963 |
| Wagon | 31985.27778 | 27613.19169 | 34250 | 17844.13971 |  |  | 25557.93919 |
| (blank) |  |  |  |  |  |  |  |
| **Grand Total** | **99508.37061** | **41110.33172** | **47351.25** | **26663.64429** | **3040.736842** |  | **40594.73703** |

**Task 4:** How does the fuel efficiency of cars vary across different body styles and model years?

* **Hints:** Line chart to show the trend of fuel efficiency (MPG) over time for each body style. Calculate the average MPG for each combination of body style and model year using AVERAGEIFS or Pivot Tables.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sum of highway MPG** | **Column Labels** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Row Labels** | **2dr Hatchback** | **2dr SUV** | **4dr Hatchback** | **4dr SUV** | **Cargo Minivan** | **Cargo Van** | **Convertible** | **Convertible SUV** | **Coupe** | **Crew Cab Pickup** | **Extended Cab Pickup** | **Passenger Minivan** | **Passenger Van** | **Regular Cab Pickup** | **Sedan** | **Wagon** | **(blank)** | **Grand Total** |
| 1990 | 152 | 280 | 62 |  | 20 |  | 94 |  | 343 |  | 132 | 264 |  | 289 | 840 | 362 |  | 2838 |
| 1991 | 451 | 195 |  | 116 |  |  | 181 |  | 497 |  | 190 | 72 |  | 356 | 993 | 316 |  | 3367 |
| 1992 | 980 | 297 | 227 | 64 |  |  | 306 |  | 382 |  | 156 |  |  | 304 | 1177 | 364 |  | 4257 |
| 1993 | 856 | 351 | 273 | 126 |  |  | 318 | 52 | 763 |  | 234 |  |  | 300 | 1469 | 318 |  | 5060 |
| 1994 | 547 | 258 | 190 | 120 | 21 | 116 | 104 | 26 | 655 |  | 142 | 21 | 164 | 130 | 1110 | 286 |  | 3890 |
| 1995 | 211 | 64 | 83 |  | 43 | 95 | 98 | 26 | 796 |  | 220 | 241 | 60 | 212 | 746 | 241 |  | 3136 |
| 1996 | 174 | 100 | 209 | 108 | 46 | 131 | 119 | 48 | 882 |  | 160 | 187 | 45 | 111 | 566 | 222 |  | 3108 |
| 1997 | 235 | 66 | 265 | 197 | 21 | 137 | 177 | 62 | 789 |  | 514 | 185 | 51 | 526 | 557 | 122 |  | 3904 |
| 1998 | 116 | 78 | 49 | 199 |  | 172 | 71 | 72 | 394 |  | 596 | 234 | 51 | 632 | 678 | 23 |  | 3365 |
| 1999 | 273 | 75 |  | 183 |  | 50 | 43 |  | 248 |  | 479 | 134 |  | 258 | 1014 |  |  | 2757 |
| 2000 | 365 | 75 |  | 266 |  | 82 | 177 |  | 145 |  | 164 | 139 | 29 | 125 | 1208 | 62 |  | 2837 |
| 2001 | 406 | 112 |  | 412 | 22 | 79 | 375 |  | 345 |  | 133 | 212 | 30 | 161 | 1451 | 245 |  | 3983 |
| 2002 | 101 | 152 |  | 673 | 21 | 73 | 337 | 163 | 472 | 51 | 364 | 347 | 15 | 331 | 1307 | 260 |  | 4667 |
| 2003 | 119 | 225 |  | 673 | 124 | 75 | 263 | 117 | 788 | 36 | 374 | 825 |  | 289 | 1407 | 96 |  | 5411 |
| 2004 | 416 | 75 | 68 | 933 | 98 |  | 201 |  | 758 | 132 | 142 | 444 |  | 240 | 1819 | 114 |  | 5440 |
| 2005 | 273 | 56 | 153 | 812 | 146 |  | 228 |  | 624 | 115 |  | 591 |  | 18 | 1571 | 437 |  | 5024 |
| 2006 | 327 |  | 345 | 916 | 69 |  | 160 |  | 655 | 252 |  | 495 |  | 18 | 990 | 575 |  | 4802 |
| 2007 | 332 |  | 358 | 1210 | 68 |  | 569 |  | 756 | 541 | 1085 | 410 |  | 509 | 987 | 744 |  | 7569 |
| 2008 | 601 |  | 228 | 1414 | 23 |  | 1058 |  | 942 | 849 | 384 | 161 |  | 162 | 1336 | 865 |  | 8023 |
| 2009 | 232 |  | 308 | 2101 |  |  | 998 |  | 926 | 705 | 477 |  |  | 306 | 2104 | 886 |  | 9043 |
| 2010 | 361 |  | 472 | 1322 |  |  | 517 |  | 541 | 739 | 395 | 242 |  | 231 | 1720 | 655 |  | 7195 |
| 2011 | 167 |  | 839 | 1698 |  |  | 431 |  | 635 | 422 | 219 | 175 |  | 54 | 2104 | 431 |  | 7175 |
| 2012 | 707 |  | 1766 | 1073 |  | 100 | 613 | 22 | 817 | 643 | 369 | 175 | 92 | 193 | 2514 | 1161 |  | 10245 |
| 2013 | 607 |  | 2236 | 1395 |  | 100 | 510 | 22 | 1111 | 469 |  | 112 | 92 |  | 2261 | 1243 |  | 10158 |
| 2014 | 937 |  | 2137 | 2931 |  | 236 | 2345 | 22 | 1809 | 283 | 87 | 312 | 262 |  | 3748 | 1410 |  | 16519 |
| 2015 | 3126 | 90 | 6020 | 14122 | 336 | 68 | 4420 |  | 5035 | 2972 | 1971 | 1418 | 508 | 796 | 19854 | 2194 |  | 62930 |
| 2016 | 2205 | 60 | 5285 | 15511 | 360 | 64 | 3624 |  | 4955 | 3116 | 1940 | 1410 | 496 | 766 | 21185 | 2012 |  | 62989 |
| 2017 | 599 | 29 | 4795 | 12363 | 320 |  | 2113 | 56 | 4077 | 3015 | 1618 | 1019 | 304 | 766 | 15451 | 1142 |  | 47667 |
| (blank) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Grand Total** | **15876** | **2638** | **26368** | **60938** | **1738** | **1578** | **20450** | **688** | **31140** | **14340** | **12545** | **9825** | **2199** | **8083** | **92167** | **16786** |  | **317359** |

**Task 5:** How does the car's horsepower, MPG, and price vary across different Brands?

* **Hints:** Bubble chart to visualize the relationship between horsepower, MPG, and price across different car brands. Assign different colors to each brand and label the bubbles with the car model name. Calculate the average horsepower, MPG, and MSRP for each car brand using AVERAGEIFS or Pivot Tables.

|  |  |  |  |
| --- | --- | --- | --- |
| **Row Labels** | **Average of Engine HP** | **Average of highway MPG** | **Average of MSRP** |
| Acura | 244.797619 | 28.11111111 | 34887.5873 |
| Alfa Romeo | 237 | 34 | 61600 |
| Aston Martin | 484.3225806 | 18.89247312 | 197910.3763 |
| Audi | 277.695122 | 28.82317073 | 53452.1128 |
| Bentley | 533.8513514 | 18.90540541 | 247169.3243 |
| BMW | 326.9071856 | 29.24550898 | 61546.76347 |
| Bugatti | 1001 | 14 | 1757223.667 |
| Buick | 219.244898 | 26.94897959 | 28206.61224 |
| Cadillac | 332.3098237 | 25.23677582 | 56231.31738 |
| Chevrolet | 246.9722471 | 25.81567231 | 28350.38557 |
| Chrysler | 229.1390374 | 26.36898396 | 26722.96257 |
| Dodge | 244.4153355 | 22.34504792 | 22390.05911 |
| Ferrari | 511.9565217 | 15.72463768 | 238218.8406 |
| FIAT | 143.559322 | 37.33870968 | 22670.24194 |
| Ford | 243.0979263 | 24.00681044 | 27399.26674 |
| Genesis | 347.3333333 | 25.33333333 | 46616.66667 |
| GMC | 259.8446602 | 21.4038835 | 30493.29903 |
| Honda | 195.7494407 | 32.57461024 | 26674.34076 |
| HUMMER | 261.2352941 | 17.29411765 | 36464.41176 |
| Hyundai | 201.9174917 | 30.39273927 | 24597.0363 |
| Infiniti | 310.0666667 | 24.77878788 | 42394.21212 |
| Kia | 206.8274336 | 30.65367965 | 25310.17316 |
| Lamborghini | 614.0769231 | 18.01923077 | 331567.3077 |
| Land Rover | 322.0979021 | 22.12587413 | 67823.21678 |
| Lexus | 277.4158416 | 25.87623762 | 47549.06931 |
| Lincoln | 284.9102564 | 24.48780488 | 42839.82927 |
| Lotus | 275.9655172 | 26.55172414 | 69188.27586 |
| Maserati | 420.7931034 | 20.29310345 | 114207.7069 |
| Maybach | 590.5 | 16 | 546221.875 |
| Mazda | 171.9929078 | 27.85106383 | 20039.38298 |
| McLaren | 610.4 | 22.2 | 239805 |
| Mercedes-Benz | 350.1818182 | 24.83002833 | 71476.22946 |
| Mitsubishi | 173.4292453 | 27.54460094 | 21240.53521 |
| Nissan | 239.9215328 | 27.79928315 | 28583.4319 |
| Oldsmobile | 177.4666667 | 26.23333333 | 11542.54 |
| Plymouth | 131.5609756 | 27.96341463 | 3122.902439 |
| Pontiac | 190.2956989 | 27.06989247 | 19321.54839 |
| Porsche | 392.7941176 | 25.36764706 | 101622.3971 |
| Rolls-Royce | 487.5483871 | 19.12903226 | 351130.6452 |
| Saab | 220.5225225 | 26.35135135 | 27413.5045 |
| Scion | 154.4333333 | 32.3 | 19932.5 |
| Spyker | 400 | 18 | 213323.3333 |
| Subaru | 197.3085938 | 28.68359375 | 24827.50391 |
| Suzuki | 160.2877493 | 26.03418803 | 17907.20798 |
| Tesla |  | 98.94444444 | 85255.55556 |
| Toyota | 236.1478495 | 26.45308311 | 29030.01609 |
| Volkswagen | 189.7577256 | 32.12855377 | 28102.38072 |
| Volvo | 230.9715302 | 27.20284698 | 28541.16014 |
| (blank) |  |  |  |
| **Grand Total** | **249.3860701** | **26.63748531** | **40594.73703** |